

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION I  
1 CONGRESS STREET - SUITE 1100  
BOSTON, MASSACHUSETTS 02114

**FACT SHEET**

DRAFT NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)  
PERMIT TO DISCHARGE TO WATERS OF THE UNITED STATES

**NPDES PERMIT NO.: MA0103357**

**NAME AND ADDRESS OF APPLICANT:**

Massachusetts Water Resources Authority (MWRA)  
Charlestown Navy Yard  
100 First Avenue  
Boston, Massachusetts 02129

**NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:**

Several construction sites associated with discharges from 8 separate outfalls within the project area (Metrowest Water Supply Tunnel) which is located in Marlborough, Southborough, Framingham, Wayland, and Weston

**RECEIVING WATERS:**

**Class A waters:** Stony Brook, Sudbury Reservoir and tributary thereto, Wachusett Aqueduct Open Channel and;

**Class B waters:** Sudbury River and tributary thereto, Charles River and tributary to Nonesuch Pond. These waters are within the Charles River Basin (State Basin Code 72 and USGS Hydrologic Code 01090001) and the Concord River Basin (State Basin Code 82 and USGS Hydrologic Code 01070005).

**I. Proposed Action, Type of Facility and Discharge Location**

The above named applicant has applied to the U.S. Environmental Protection Agency for the reissuance of an NPDES permit to discharge into the designated receiving waters. The permittee is engaged in the temporary discharge of water during various phases of the construction of the MetroWest Water Supply Tunnel. The discharges will be to the receiving waters listed above, through Outfalls 001, 002, 003, 004, 013, 015, 016 and 017. See Figures 1 through 4 for outfall locations.

## **II. Description of Discharges**

The characteristics of these discharges will be typical of tunnel and related near-surface construction activities which necessitate site dewatering, hydraulic pressure testing and disinfection of installed water supply tunnel segments. See sampling results from the four most active discharges during the past 5 years, beginning on Table 1.

## **III. Limitations and Conditions**

The effluent limitations and the monitoring requirements may be found in the draft permit.

## **IV. Permit Basis and Explanation of Effluent Limitation Derivation**

The MWRA is in the process of constructing a supplemental pressure aqueduct to improve the service reliability of the primary water transmission system currently supplying 40 MWRA communities in the Boston metropolitan area. Construction for this project began in 1996 and is expected to end in 2004. This project is the 17.6 mile Metro West Water Supply Tunnel (MWT) which will run from Marlborough to Weston, generally paralleling the Massachusetts Turnpike.

Water supply for these communities is now provided by the Hultman Aqueduct and the Weston Aqueduct. The Hultman Aqueduct is the primary transmission line, extending from Marlborough to Weston. It is a pressure aqueduct capable of providing water to the high elevation areas of the communities served. The Weston Aqueduct is supplied by the Hultman and provides water to lower elevation areas of the communities. The MWT will provide full redundancy for both aqueducts. Under normal operating conditions, the MWT will be used to transport approximately half of the water into the Boston area, operating in parallel to the Hultman Aqueduct.

The availability of the MWT will also enable the MWRA to remove the Hultman from service temporarily for maintenance or repairs. The Hultman Aqueduct is over 55 years old and requires significant repairs, as several significant leaks have been identified along its length. As the system is currently configured, the Hultman cannot be removed from service for a period of more than about 10 hours which only allows for very minor repairs to be made. The existing aqueducts in the area are gravity aqueducts with insufficient capacities and pressures to replace the flows and delivery capabilities of the Hultman. An emergency shutdown of the Hultman lasting more than one day would necessitate use of emergency water supplies at the heads of the Weston and Sudbury Aqueducts. Even the use of these emergency sources would result in shortages with some communities being entirely without water.

## **Project Status**

The entire length of this 17.6 mile deep rock tunnel has been excavated as well as five of the major tunnel shafts and five additional risers which will connect to local municipal water systems.

The excavation for the two remaining tunnel shafts is ongoing. Remaining activities for the project will include the concrete lining of the tunnel, shafts and risers, the construction of the connecting pipelines and near-surface facilities such as valve chambers, and final site work which will be followed by tunnel pressure testing and disinfection.

Table 2 shows the construction sites with their corresponding outfalls for Outfalls 001, 002, 003 and 004. Table 3 lists the construction site locations, their estimated active construction periods, estimated flows, available treatment and discharge locations.

### **Waterbody Classification and Usage**

Stony Brook, Sudbury Reservoir and the Wachusett Aqueduct Open Channel at their points of discharge are classified according to the Massachusetts Surface Water Quality Standards as Class A waterbodies. Class A waters are designated as sources of public water supply. To the extent compatible with this use they shall be an excellent habitat for fish, other aquatic life and wildlife, and suitable for primary and secondary contact recreation. These waters shall have excellent aesthetic value. These waters are designated for protection as Outstanding Resource Waters under 314 CMR 4.04(3).

The Sudbury River, the Charles River and the tributary to Nonesuch Pond at their points of discharge are classified according to the Massachusetts Surface Water Quality Standards as Class B waterbodies. Class B waters shall be of such quality that they are suitable for the designated uses of protection and propagation of fish, other aquatic life and wildlife; and for primary and secondary contact recreation.

When this permit was issued in 1996, the authorized discharges were considered "new discharges" (314 CMR 3.02{27}) to surface waters of the Commonwealth. Discharges to Class A waters are prohibited (314 CMR 4.04) except for the express purpose of enhancing the resource while not causing any significant impacts. These discharges were authorized under the 1996 NPDES permit after there was an antidegradation review under the provisions of the Massachusetts Surface Water Quality Standards (314 CMR 4.04{2}). These discharges were deemed necessary for the protection and enhancement of the water resources which are part of the MWRA water supply system. The MADEP believes that the discharges will not impact water quality and water use. The discharges are considered insignificant due to the following:

- \* their temporary nature
- \* upon completion of the project, the water quality of the system will be equal or better than prior to the project
- \* the project will not interfere with the water use (as back-up water supply)
- \* the only impact from the discharges will be from color/turbidity (aesthetics) and some very localized sedimentation

The Antidegradation Evaluation conducted by the MADEP demonstrated that the existing uses and water quality of the receiving waters would be maintained and protected during the period of construction. In correspondence dated October 23, 1995, the Director of the MADEP's Office of Watershed Management (OWM) determined that a variance for discharge to the Class A waters was acceptable as the project was necessary and would enhance the water resources and was accepted by the agency under control of the resource. The Director has also determined that any lowering of water quality during construction will be insignificant, as these discharges will be temporary and the Class B water quality will return or improve when the discharges cease. A variance for the Class B waters is thus not needed. The MADEP has determined that the previous antidegradation evaluation and corresponding variance will be extended with the reissuance of this permit.

The EPA and the MADEP have determined that there will not be a need for a post-construction permit. This determination is contingent upon the permittee implementing and maintaining pollution control facilities and BMPs, which will assure that water quality will be adequately protected from any pollutants from completed construction sites entering adjacent waterways.

The Clean Water Act (CWA) requires that discharges satisfy both minimum technology and water quality requirements. The minimum technology requirements which are presently applicable are Best Practicable Control Technology Currently Available (BPT), Section 301(b)(1)A of the CWA; Best Available Technology Economically Achievable (BAT) for toxic pollutants, Section 301(b)(2)A; and Best Conventional Pollution Control Technology (BCT), Section 301(b)(2)E which applies to conventional pollutants. In the absence of technology based guidelines EPA is authorized to use Best Professional Judgment (BPJ) in accordance with Section 402(a)(1) of the CWA. In addition, Section 301(b)(1)(c) of the CWA requires that effluent limitations based on water quality considerations be established for point source discharges when such limitations are necessary to meet State or Federal Water Quality standards that are applicable to the designated receiving water.

**Description of Discharges:** The permit will authorize the following types of discharges which will employ specific monitoring and treatment as described below. Where there is more than one type of discharge at one outfall, the outfall number is designated with the letter designation at the end of the outfall number as noted below.

**Shaft and tunnel construction water discharges** consist of groundwater infiltrating into the shaft and tunnel during construction and lining at Outfalls 001, 002 and 004. Groundwater infiltration rates have been estimated for each site based upon experience from other tunnel projects and results of geotechnical investigations conducted by the applicant. The permit flow limits reflect these estimates. These discharges are designated by the letter "B" at the end of the outfall number.

Monitoring of tunnel discharges for several parameters was required under the existing permit. The basis for these limits was a combination of State water quality standards and Best

Professional Judgement (BPJ) authority granted under the CWA. The limits for pH, dissolved oxygen, and fecal coliform reflect the water quality standards for Class A and Class B waters. The remaining limits for flow, color, iron, manganese, sulfides, sodium, TSS, fluoride, petroleum hydrocarbons and residual chlorine were originally based on a combination of what the EPA and MADEP believed were protective levels and were achievable with construction related treatment options that were expected to be employed.

For the reissued permit, all the monitoring data were reviewed and determinations were made for the parameters which will continue to be monitored. The flows at the tunnel shafts are believed to have already experienced their peaks and flows in general are expected to continually decrease as the project nears completion with tunnel lining and grouting activities. Continuous monitoring of flows from each shaft will continue to be required throughout the duration of these activities. There would be no bypass of the treatment system allowed as additional pumps and treatment system modules could be provided if any unexpected increases in flow occur.

The discharge temperatures were found to be fairly consistent and within the established limits for all sampled outfalls, reflecting ambient levels. Therefore, all temperature monitoring under this permit has been discontinued as past results do not indicate any potential impact.

Tunnel lining and grouting could increase the alkalinity and pH of the water. For these discharges, pH neutralization may be necessary to maintain the discharge within the permitted range of 6.5 to 8.3 standard units.

A tunnel boring machine (TBM) was used to excavate the majority of the tunnel and this equipment may have resulted in releases of oil and grease. The concentration of O&G is highly dependent on the workmanship and operations of the contractor. Although all of the tunnel boring work is completed, daily monitoring for TPH will be continued due to the potential of residual amounts of oil & grease that may still be present. Oil/water separators, sorbent booms or other measures will be employed to maintain discharges of TPH below 1 mg/l. Sampling results have shown consistent, detectable readings for this parameter and this requirement has been retained for all pertinent outfalls.

Although previous data on ambient bedrock groundwater showed no indication of any detectable levels of coliform bacteria, there were some very high levels detected in Outfalls 001, 004 and 005. Therefore, the fecal coliform limits for Outfalls 001, 002 and 004 related to tunnel excavation and lining will be continued. These outfalls are designated with the letter "B".

The tunnel lining operations are expected to create particulates which would be transported through the tunnel and discharged at the surface. Continuous monitoring for turbidity and periodic monitoring for TSS, and color was implemented to control the discharge of fine particles from tunneling operations. Review of the sampling results has shown that there are consistent levels of TSS with occasional violations. Limits and monitoring frequency for TSS will be kept identical to those of the existing permit. The levels of color and turbidity are

generally in the single digit range, normally well below the previously established permit limits. Therefore, the monitoring will continue for color and turbidity, but at lower testing frequencies. Weekly to monthly monitoring for several elements prevalent in bedrock and groundwater - iron, manganese and sulfides - were established in the existing permit and based on BPJ. Sampling results indicate very low levels of manganese and this requirement has been discontinued for all outfalls. Sulfides monitoring has been discontinued for outfall 001, but retained for other outfalls due to its presence close to or above permitted levels. Iron monitoring will still be required as it has shown up consistently in sampling results for all outfalls. The iron monthly average limit is based on EPA's water quality criteria while the daily maximum limit of 2.0 mg/l is based on BPJ.

Where necessary, tunneling contractors have used a multi-stage treatment process to meet the effluent limitations included in this permit. This type of system has included processes that accomplish flow equalization, removal and disposal of oils and solids, and additional effluent treatment for solids as necessary. Additional treatment functions to ensure compliance with temperature, pH, dissolved oxygen and other listed parameters have also been employed. For discharges to the Sudbury River at Outfall 001, an equalization basin is being used before any other treatment and is sized to provide adequate detention time based on the peak daily flow anticipated.

For gross oil removal, oil booms have been used at the outfall or within sedimentation tanks. Where necessary, additional oil removal has been accomplished using a coalescing plate oil/water separator or similar device. Filtration is the contractor's preferred process for solids removal when necessary. Polymer and liquid alum have been used to improve the efficiency of the filtration process. The DEP will be reviewing and approving plans for any new treatment systems. The permittee or its contractor will be required to discharge through a pipe to a riprap ditch at each discharge point. Check dams will be used in the ditch to achieve energy dissipation and reduce erosion. The riprap discharge structure will be expanded laterally to reduce the flow volume at the point of discharge.

**Surface excavation dewatering discharges** consist of groundwater entering the excavations and storm water which may collect in excavation areas. This type of dewatering discharge is possible at every outfall listed in this permit except for Outfall 004 and is designated with the letter "C" after the outfall number, unless it is the only type of discharge through that outfall. Although these discharges result from operations at the Outfall 002 site, this water is commingled in a treatment basin with excavation and lining activities discharges and is authorized under Outfall 002B. Because excavation sites are typically close to reservoirs, open transmission channels or wetlands areas, the water table typically is very high in the area of pipeline work. The high water table necessitates that groundwater infiltration into the trench excavation be removed by discharging away from the excavation. This construction is expected to be completed in 2003.

**Hydraulic pressure testing discharges** are necessary prior to tunnel start-up operations. After a segment of tunnel has been constructed, pressure testing of that completed segment will be

performed by filling the tunnel with water and assuring that a certain pressure can be maintained for a designated period of time. The source of this water will be drinking water from the MWRA system which has received treatment for fluoridation, corrosion control, and disinfection. The MWRA water used in the pressure testing operations will be of drinking water quality and will be released at the maximum rate noted in the permit. Pressure testing operations may also require the release of MWRA water and/or groundwater which has infiltrated into the tunnel.

Prior to start-up operation and after pressure testing is completed, the tunnel lining must be disinfected. The tunnel and surface pipelines will be disinfected by filling the pipelines with water supplied from the Wachusett Reservoir and adding calcium hypochlorite to water in the tunnel to achieve the chlorine residual needed to adequately disinfect the tunnel. Residual chlorine will be removed and the pH will be neutralized prior to release into surface waters at Shaft 5A , Outfall 004 and at Shaft L, Outfall 001. Discharge will take place through the same outfall system used for the tunnel construction waters.

Pressure tested and disinfected water from a variety of other tunnel segments will be directed to local sewer or transported off site for disposal to be determined based on how contracts for these segments are structured. Discharge of disinfected water to waters of the United States is only authorized from Outfalls 001 and 004 and is designated with the letter “D” at the end of the outfall number.

The previous permit had established limits of 0.1 mg/l for TRC for both outfalls. This limit was based on a BPJ determination. This reissued permit has established water quality based limits based on calculations for these two outfalls using the 7Q10 stream flow, as measured at United States Geological Service (USGS) gages in the vicinity of the discharges. To calculate these water quality based effluent limits, the 7Q10 flow is required, which represents the statistical 7 day low flow over a 10 year period.

Calculations in Attachment A result in limits for both outfalls that would be more stringent than the 0.1 mg/l in the previous permit. These limits will be established for the short term periods when the permittee will discharge this water through the new sections of pipeline.

### **Outfalls 013, 015, 016 and 017**

These four outfalls will be comprised of dewatering discharges from near surface pipe excavation. At these locations, the permittee will be constructing risers to connect the MWT to community drinking water systems. As with the existing permit, these discharges will be limited for a flow rate, total suspended solids, total petroleum hydrocarbons and pH. These discharges are expected to be treated with a sedimentation tank for solids removal.

## **Storm Water**

Storm water which is not part of the dewatering discharge is expected to dissipate into the surrounding area by sheet flow. This runoff will be treated by the use of Best Management Practices (BMPs) at all of the construction sites. These BMPs will include measures to prevent erosion and sedimentation from project construction activities and will be included in the permittee's "Oil and Hazardous Materials Management and Spill Control Program" which is described beginning on Page 18 of the permit. The permittee shall continue to abide by this program and any subsequent revisions to it. This program shall be kept on site at all the remaining construction areas.

The effluent monitoring requirements have been established to yield data representative of the discharge under authority of Section 308(a) of the CWA as required by 40 CFR 122.41, 122.44 and 122.48.

The remaining general and special conditions of the permit are based on the NPDES regulations 40 CFR Parts 122 through 125 and consist primarily of management requirements common to all permits.

### **V. Essential Fish Habitat Determination (EFH):**

Under the 1996 Amendments (PL 104-267) to the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. § 1801 et seq. (1998)), EPA is required to consult with the National Marine Fisheries Services (NMFS) if EPA's action or proposed actions that it funds, permits, or undertakes, may adversely impact any essential fish habitat as: waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (16 U.S.C. § 1802 (10)). Adversely impact means any impact which reduces the quality and/or quantity of EFH (50 C.F.R. § 600.910 (a)). Adverse effects may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey, reduction in species' fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions.

Essential fish habitat is only designated for species for which federal fisheries management plans exist (16 U.S.C. § 1855(b) (1) (A)). EFH designations for New England were approved by the U.S. Department of Commerce on March 3, 1999. EPA has determined that a formal EFH consultation with NMFS is not required because the proposed discharge will not adversely impact EFH.

### **VI. State Certification Requirements**

EPA may not issue a permit unless the State Water Pollution Control Agency with jurisdiction over the receiving waters certifies that the effluent limitations contained in the permit are stringent enough to assure that the discharge will not cause the receiving water to violate State Water Quality Standards. The staff of the Massachusetts Department of Environmental Protection has

reviewed the draft permit and advised EPA that the limitations are adequate to protect water quality. EPA has requested permit certification by the State and expects that the draft permit will be certified.

**VII. Public Comment Period and Procedures for Final Decision**

All persons, including applicants, who believe any condition of the draft permit is inappropriate must raise all issues and submit all available arguments and all supporting material for their arguments in full by the close of the public comment period, to the U.S. EPA, Office of Ecosystem Protection (SPA), 1 Congress Street, Suite 1100, Boston, Massachusetts 02114-2023. Any person, prior to such date, may submit a request in writing for a public hearing to consider the draft permit to EPA and the State Agency. Such requests shall state the nature of the issues proposed to be raised in the hearing. A public hearing may be held after at least thirty days public notice whenever the Regional Administrator finds that response to this notice indicates significant public interest. In reaching a final decision on the draft permit the Regional Administrator will respond to all significant comments and make these responses available to the public at EPA's Boston office.

Following the close of the comment period, and after a public hearing, if such hearing is held, the Regional Administrator will issue a final permit decision and forward a copy of the final decision to the applicant and each person who has submitted written comments or requested notice.

**VIII. EPA & DEP Contacts**

Additional information concerning the draft permit may be obtained between the hours of 9:00 a.m. and 5:00 p.m., Monday through Friday, excluding holidays, from the EPA and DEP contacts below:

George Papadopoulos, Massachusetts Office of Ecosystem Protection  
One Congress Street, Suite 1100 - Mailcode CPE, Boston, MA 02114-2023  
Telephone: (617) 918-1579 FAX: (617) 918-1505

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July 22, 2002  
Date

Linda M. Murphy, Director  
Office of Ecosystem Protection  
U.S. Environmental Protection Agency

Attachments A& B below; Tables 1, 2 & 3 not provided electronically